Ontario

Ontario Ministry of Agriculture, Food and Rural Affairs

2009 SUPPLEMENT

Fruit Production Recommendations

Publication 360S January 2009

This supplement contains new product registrations and changes from January 2008 to January 2009. For complete information, please refer to the full edition of Publication 360, *Fruit Production Recommendations*, 2008–2009 published in March 2008. This supplement can be downloaded from the OMAFRA website at www.ontario.ca/crops. Refer to this website for updates throughout the year. Printed copies are available from OMAFRA Resource Centres.

New Products

New Products	Registrant	Registration number	Crops	Pests	Relative acute toxicity (Table 9-1, pg. 185-186)	Bee toxicity (Table 9-4, pg.193)
Allegro 500F (fluazinam 500 g/L)	Syngenta Crop Protection Canada Inc.	27517	blueberries	suppression of mummyberry, suppression of phomopsis fruit rot, suppression of anthracnose fruit rot	Caution — poison lower acute toxicity	Relatively non-toxic
Altacor (chlorantraniliprole 35%)	E.I. Du Pont Canada Company	28981	apples	codling moth, tentiform leafminer, oriental fruit moth, obliquebanded leafroller	Very low	Relatively non toxic
			grapes	grape berry moth, climbing cutworms		
			pears	codling moth, oriental fruit moth, obliquebanded leafroller		
			apricots, peaches, plums, cherries	oriental fruit moth, obliquebanded leafroller		
Delegate WG (spinetoram 25%)	Dow AgroSciences Canada Inc.	28778	apples, pears	codling moth, oriental fruit moth, leafrollers, tentiform leafminer, plum curculio	Very low	Highly toxic
			blueberries	spanworm		
			raspberries	obliquebanded leafroller		

New Products	Registrant	Registration number	Crops	Pests	Relative acute toxicity (Table 9-1, pg. 185-186)	Bee toxicity (Table 9-4, pg.193)
Delegate WG (cont'd)			grapes	grape berry moth suppression		
			stone fruit (i.e. peaches, plums, cherries, apricots)	oriental fruit moth, leafrollers		
			strawberries	thrips suppression		
Maxcel (6-benzyladenine)	Valent Biosciences Corporation	28851	apples	plant growth regulator for thinning and improving fruit size	Very low	
Movento 240 SC (spirotetramat 240 g/L))	Bayer CropScience	28953	apples	aphids, San Jose scale insects	Very low	Highly toxic
			grapes	phylloxera		
			cherries, peaches, plums	aphids		
			pears	aphids, San Jose scale, pear psylla		
			nut trees	aphids, San Jose scale		
Perm-UP (permethrin 384 g/L)	United Phosphorus Inc.	28877	apples	tentiform leafminer, dogwood borer	Caution — poison Lower acute toxicity	Highly toxic
			grapes	grape leafhopper, grape berry moth		
			peaches, nectarines	oriental fruit moth		
			pears	pear psylla		
Pounce 384EC (permethrin 384 g/L)	FMC	16688	grapes	climbing cutworm	Caution — poison Lower acute toxicity	Highly toxic
Revus (mandipropamid 250 g/L)	Syngenta Crop Protection Canada Inc	29074	grapes	downy mildew	Very low	Relatively non-toxic
Silencer 120 EC (lambda-cyhalothrin 120 g/L)	Makhteshim Agan of North America	29052	apples	tentiform leafminer, plant bugs	Danger — poison High acute toxicity	Highly toxic
			pears	pear psylla		
			strawberries	strawberry clipper weevil, plant bugs		
			peaches	oriental fruit moth, tarnished plant bugs		

New Products	Registrant	Registration number	Crops	Pests	Relative acute toxicity (Table 9-1, pg. 185-186)	Bee toxicity (Table 9-4, pg.193)
Up-Cyde 2.5 EC (cypermethrin 250 g/L)	United Phosphorus Inc	28795	apples	tentiform leafminer, tarnished plant bugs	Danger — poison High acute toxicity	Highly toxic
			grapes	grape berry moth, grape leafhopper		
			peaches	tarnished plant bug, oriental fruit moth		
			pears	pear psylla		
			strawberries	strawberry clipper weevil, tarnished plant bug		

Product changes or corrections

Chapter	Crop	Product to change	Diseases and Insects	Timing	Change
4	Apples	Lannate	tentiform leafminer mullein bug	Petal fall (pg. 54)	Add product to calendar at these timings.
7	Pears	Calypso 480 SC	codling moth oriental fruit moth	Special sprays (pg. 172)	Delete product at these timings, because Calypso has a 30 days to harvest interval.

Additions and New Uses for 2008

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 4: Apple Calendar					
Altacor	Tentiform leafminer	Tight cluster to pink (pg. 52) Petal fall (pg. 54) Special summer sprays (pg. 61) Non-bearing orchards (pg. 64)	215 g/ha	For overwintering obliquebanded leafroller apply at petal fall in orchards with historical pest problems or high pest pressure. For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix of first sustained moth catch. For 1st generation codling moth, apply before 1st egg hatch, 80 degree days C (base 11 C°) after biofix of first sustained moth catch in traps. Monitor populations and reapply 10–14 days later if required. For 2nd generation codling moth apply before 1st egg hatch, and re-apply later if necessary. For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix of first sustained moth catch. Monitor populations and reapply 10–14 days later if required.	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 14 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year
	Obliquebanded leafroller	Petal fall (pg. 56) Special summer sprays (pg. 61)	285 g/ha		
	Codling moth	1st summer spray (pg. 59) Subsequent summer sprays (pg. 60)	215 g/ha		
	Oriental fruit moth	Petal fall (pg. 57) Special summer sprays (pg. 61)	215 g/ha		

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 4: Apple Calendar (continued)					
Delegate WG	Tentiform leafminer	Tight cluster to pink (pg. 52) Petal fall (pg. 54) Special summer sprays (pg. 61) Non-bearing orchards (pg. 64)	420 g/ha	When used at petal fall, Delegate will also suppress plum curculio. For overwintering obliquebanded leafroller apply at petal fall in orchards with historical pest problems or high pest pressure. For summer generation OBLR, apply at 240–280 degree days C (base 6.1 C°) after biofix of first sustained moth catch. For codling moth apply at 2–3 days earlier (~80 degree days C, base 11 C°) than conventional insecticides in orchards with high pest pressure. In low pressure orchards timing is similar to conventional insecticides. Repeat at 14 day intervals to maintain control, if required. For 2nd generation codling moth apply before 1st egg hatch, and re-apply later if necessary. For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix of first sustained moth catch. Monitor populations and reapply 10–14 days later if required. When used for codling moth, Delegate will also suppress apple maggot.	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.
	Obliquebanded leafroller	Petal fall (pg. 56) Special summer sprays (pg. 61)	420 g/ha		
	Codling moth	1st summer spray (pg. 59) Subsequent summer sprays (pg. 60)	420 g/ha		
	Oriental fruit moth	Petal fall (pg. 57) Special summer sprays (pg. 62)	420 g/ha		
Movento 240 SC	Rosy apple aphid	Half-inch green to tight cluster (pg.50) Pink (pg. 53) Petal fall (calyx) (pg. 54) First summer spray (pg. 59) Special summer sprays (pg. 61)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to one week. Allow at least 14 days between applications.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.83 L/ha
	Green apple aphid	Special summer sprays (pg. 61)	365 mL/ha		
	Woolly apple aphid	Special summer sprays (pg. 61)	365 mL/ha		

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 4: Apple Calendar (continued)					
Perm-UP	Tentiform leafminer	Tight cluster to pink (pg. 52) Petal fall (pg. 54) Special summer sprays (pg. 61) Non-bearing orchards (pg. 64)	520 mL/ha		Common name: permethrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours
	Dogwood borer	Special summer sprays (pg.61)	22 mL/100 L water plus 2 L superior oil	Make 2 applications at 2–3 week intervals when adults are flying (late June-early August).	
Silencer 120 EC	Tentiform leafminer	Tight cluster to pink (pg. 52) Petal fall (pg. 54) Special summer sprays (pg. 61) Non-bearing orchards (pg. 64)	83 mL/ha	Pyrethroids are highly toxic to beneficial insects and may lead to outbreaks of European red mite. Use of this product is discouraged for summer generations of tentiform leafminer.	Common name: lambda-cyhalothrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 24 hours Maximum # applications/year: 3
	Plant bugs	Tight cluster to pink (pg. 52)	104 mL/ha		
Up-Cyde 2.5 EC	Tentiform leafminer	Tight cluster to pink (pg. 52) Petal fall (pg. 54) Special summer sprays (pg. 61) Non-bearing orchards (pg. 64)	400 mL/ha	Pyrethroids are highly toxic to beneficial insects and may lead to outbreaks of European red mite. Use of this product is discouraged for summer generations of tentiform leafminer.	Common name: cypermethrin Group: Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3
	Leaf curling midge	Non-bearing orchards, post bloom (pg. 64)			
Chapter 5: Blueberry Calendar					
Allegro 500F	Mummyberry	Bud swell to pink bud (pg. 97)	2.24 L/ha	Provides suppression rather than control of these diseases.	Common name: fluazinam Group 29 fungicide Preharvest interval: 30 days Re-entry period: 24 hours Maximum # applications/year: 4
	Phomopsis fruit rot Anthracnose fruit rot	Green tip (pg. 97) Pink bud (pg. 97) First bloom (pg. 98) Petal fall (pg. 98)			
Delegate WG	Blueberry spanworm	Bud swell to pink bud (pg. 97) Green fruit (pg. 99)	200 g/ha	Spray tank solution should be between pH 6 and 8 for optimum control.	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 3 days Re-entry period: 12 hours Maximum # applications/year: 3

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 5: Raspberry Calendar					
Admire 240 F	White grubs (larvae of European chafer)	Green fruit (pg. 106) or Post harvest (pg. 107)	1.2 L/ha	Do not apply during bloom. Apply to damp soil in the plant row and in the alleys, in 200 L water/ha. Move the product into the root zone with 5–10 mm irrigation within 24 hours of application.	Common name: imidacloprid Group 4 insecticide:(neonicotinoid) Preharvest interval: 14 days for soil drench or 4 days for foliar applications Re-entry period: 24 hours Maximum # applications/year: 1 soil drench or 3 foliar applications.
	Leafhoppers Aphids	Green fruit (pg. 106)	175 mL/ha	Do not apply prebloom, during bloom, or when bees are actively foraging. Apply in 300 L water as a foliar spray. May provide suppression rather than control.	
	Raspberry cane borer	Green fruit (pg. 106)	467 mL/ha		
	Red-necked caneborer	Green fruit (pg. 106)	467 mL/ha		
Delegate WG	Obliquebanded leafroller	Prebloom (pg. 105) Green fruit (pg. 106)	200 g/ha	Spray tank solution should be between pH 6 and 8 for optimum control.	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 1 day Re-entry period: 12 hours Maximum # applications/year: 3
Surround WP	Potato leafhopper	New plantings, July-mid August (pg. 105)	25 kg/ha	Apply at 7 to 14-day intervals when leafhoppers are first detected by monitoring. Use 12.5 to 25 kg **Surround WP** per 500 L of water. For early applications, use 25 kg **Surround WP** per 500 L of water. Once a base coat is established, rate can be reduced for follow-up applications to 12.5 kg **Surround WP** per 500 L of water. Not recommended when fruit is present. May leave a white residue on fruit. Not recommended during bloom.	Common name: kaolin Particle film product Preharvest interval: 1day Re-entry period: none specified
Chapter 5: Saskatoon Berry Calendar					
Admire 240 F	Woolly elm aphid Woolly apple aphid	Early to mid July, after harvest is complete. (pg. 112)	For each plant: 0.125 mL	Do not apply during bloom. Apply to the soil at the base of each plant, followed by sufficient water to move the product to the root zone.	Common name: imidacloprid Group 4 (neonicotinoid) Preharvest interval: 14 days Re-entry period: 24 hours Maximum # applications/year: 1

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 5: Strawberry Calendar					
Delegate WG	Thrips (suppression)	7–10 days after first bloom (pg. 116) Preharvest (pg. 116)	280 g/ha	Delegate is registered for suppression, rather than control, of thrips. Product is also labeled for greenhouse use. Spray tank solution should be between pH 6 and 8 for optimum control.	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 1 day Re-entry period: 12 hours Maximum # applications/year: 3
Silencer 120 EC	Strawberry clipper weevil	As flower buds extend from the crown (pg. 115)	104 mL/ha		Common name: lambda-cyhalothrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 24 hours Maximum # applications/year: 3
	Tarnished plant bug	First bloom (pg. 115) 7–10 days after first bloom (pg. 116)	104 mL/ha		
Surround WP	Potato leafhopper	New plantings, July–mid August (pg. 113)	25 kg/ha	Apply at 7 to 14-day intervals when leafhoppers are first detected by monitoring. Use 12.5–25 kg **Surround WP** per 500 L of water. For early applications, use 25 kg **Surround WP** per 500 L of water. Once a base coat is established, rate can be reduced for follow-up applications to 12.5 kg **Surround WP** per 500 L of water per ha. Not recommended when fruit is present. May leave a white residue on fruit. Not recommended during bloom.	Common name: kaolin Group: Particle film product Preharvest interval: 1 day Re-entry period: none specified
Up-Cyde 2.5 EC	Strawberry clipper weevil	As flower buds extend from the crown (pg. 115)	280 mL/ha		Common name: cypermethrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3
	Tarnished plant bug	First bloom (pg. 115) 7–10 days after first bloom (pg. 116)	400 mL/ha		

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 6: Grape Calendar					
Altacor	Climbing cutworm	Bud burst to first leaf (new section (pg. 130)	285 g/ha	Grape berry moth – Apply at 1st egg hatch (first sustained moth catch in traps), earlier than the traditional timing (upswing in moth numbers captured in pheromone traps) used for Guthion, Sniper, Diazinon, Pounce or Imidan. Climbing cutworms – monitor bud development and presence of cutworms.	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 14 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year
	Grape berry moth	Immediate prebloom (pg. 132) Berries pea-sized (pg. 135) Beginning of ripening (pg. 136)	285 g/ha		
Delegate WG	Grape berry moth	Immediate prebloom (pg. 132) Berries pea-sized (pg. 135)	280 g/ha	Apply Delegate at 1st egg hatch, (first sustained moth catch in traps), earlier than the traditional timing used for Guthion, Sniper, Diazinon, Pounce or Imidan (upswing in moth numbers captured in pheromone traps). Delegate is registered for suppression, rather than control, of grape berry moth, and is not recommended for third generation.	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.
Movento 240 SC	Phylloxera	Immediate prebloom Immediate post bloom to early fruit set (pg. 133) Berries pea sized (pg. 135)	365 mL/ha	Consecutive applications should be at least 30 days apart.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 920 mL/ha
Pounce 384EC	Climbing cutworm	Bud burst to first leaf (new section) (pg. 130)	180 mL/ha	Increase rate to 360 mL/ha if cutworms are large (2–3 cm). Apply in at least 450 L of water per hectare. Spray trunk and soil surface within 0.5 m of the trunk in the evening. Do not disturb the soil for 5 days after spraying.	Common name: permethrin Group 3 insecticide (pyrethroid) Preharvest interval: 21 days Maximum # applications/year: 2

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 6: Grape Calendar (continued)					
Perm-UP	Grape berry moth	Immediate prebloom (pg. 133) Berries pea-sized (pg. 135) Beginning of ripening (pg. 136)	360 mL/ha		Common name: permethrin Group 3 insecticide (pyrethroid) Preharvest interval: 21 days Re-entry period: 12 hours
	Leafhoppers	Immediate prebloom (pg. 132) Immediate postbloom to early fruit set (pg. 133)	175 mL/ha		
Revus	Downy mildew	Shoot length 20–25 cm (pg. 131) Immediate prebloom (pg. 133) Immediate post bloom (pg. 134) Berry touch to berry (pg. 136) Beginning of ripening (pg. 136)	500 mL/ha	The use of a non-ionic adjuvant is recommended (0.125% volume: volume)	Common name: mandiopropamid Group 40 fungicide Preharvest interval: 14 days Re-entry period: 12 hours Maximum # applications/year: 4
Chapter 7: Apricot Calendar					
Altacor	Oriental fruit moth	Shuck split (pg. 148) Special sprays (pg. 149)	285 g/ha	For oriental fruit moth, apply at 1st egg hatch, 50-100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required. For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix (first sustained moth catch).	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 10 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year
	Obliquebanded leafroller	Special sprays (when monitoring indicates the need) (pg. 149)	285 g/ha		
Delegate WG	Oriental fruit moth	Shuck split (pg. 148) Special sprays (pg. 149)	420 g/ha	For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required. For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix (first sustained moth catch).	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 14 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.
	Obliquebanded leafroller	Special sprays (when monitoring indicates the need) (pg. 149)	420 g/ha		

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 7: Sour Cherry Calendar					
Altacor	Obliquebanded leafroller	First cover (12 days after shuck) (pg. 152) Second cover (12 days after first cover) (pg. 153)	285 g/ha	For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required. For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix.	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 10 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year
Delegate WG	Obliquebanded leafroller	First cover (12 days after shuck) (pg. 152) Second cover (12 days after first cover) (pg. 153)	420 g/ha	For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix (first sustained moth catch).	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.
Flint 50 WG	Powdery mildew	Petal fall (pg. 151) First cover (12 days after shuck) (pg. 152) Second cover (12 days after first cover) (pg. 153)	210 g/ha	Do not apply sequential applications of Flint or other strobilurin fungicides before alternating to a non-strobilurin fungicide for resistance management. Do no apply where spray drift may reach Concord grapes as it may cause crop injury.	Common name: trifloxystrobin Group 11 fungicide (strobilurin) Preharvest interval: 1 day Re-entry period: 12 hours Maximum # applications/year: 2
	Cherry leaf spot	Petal fall (pg. 151) First cover (12 days after shuck) (pg. 152) Second cover (12 days after first cover) (pg. 153) Postharvest (pg. 153)	210 g/ha		
Movento 240 SC	Aphids	Special sprays (pg. 154)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to one week. Allow at least 14 days between applications.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.12 L/ha
Chapter 7: Sweet Cherry Calendar					
Altacor	Obliquebanded leafroller	Special sprays (when monitoring indicates the need) (pg. 159)	285 g/ha	For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix.	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 10 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 7: Sweet Cherry Calendar (continued)					
Delegate WG	Obliquebanded leafroller	Special sprays (when monitoring indicates the need) (pg. 159)	420 g/ha	For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix (first sustained moth catch).	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.
Flint 50 WG	Powdery mildew	Second cover (12 days after first cover) (pg. 158)	210 g/ha	Do not apply sequential applications of Flint or other strobilurin fungicides before alternating to a non-strobilurin fungicide for resistance management. Do no apply where spray drift may reach Concord grapes as it may cause crop injury.	Common name: trifloxystrobin Group 11 fungicide (strobilurin) Preharvest interval: 1 day Re-entry period: 12 hours Maximum # applications/year: 2
	Leaf spot	Postharvest orchard treatment (pg. 159)	210 g/ha		
Movento 240 SC	Black cherry aphid	Petal fall (pg. 157)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to one week. Allow at least 14 days between applications.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.12 L/ha
Chapter 7: Peach Calendar					
Altacor	Oriental fruit moth	2nd generation oriental fruit moth spray (pg. 163) 3rd generation oriental fruit moth spray (pg. 164)	285 g/ha	For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required. Check the harvest dates of early varieties and do not spray within the preharvest interval of 10 days.	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 10 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year
Delegate WG	Oriental fruit moth	2nd generation oriental fruit moth spray (pg. 163) 3rd generation oriental fruit moth spray (pg. 164)	420 g/ha	For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required. Check the harvest dates of early varieties and do not spray within the preharvest interval of 14 days.	Common name: spinetoram Group 5 insecticide (naturalyte): Preharvest interval: 14 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 7: Peach Calendar (continued)					
Movento 240 SC	Aphids	Petal fall and shuck spray (pg. 162)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to one week. Allow at least 14 days between applications.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.12 L/ha
Perm-UP	Oriental fruit moth	2nd generation oriental fruit moth (pg. 163) 3rd generation oriental fruit moth (pg. 164) Prepick spray (pg. 164)	275 mL/ha		Common name: permethrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours
Silencer 120 EC	Tarnished plant bug	Special sprays (when monitoring indicates the need during early green fruit stage to pit hardening) (pg. 163)	104 mL/ha		Common name: lambda-cyhalothrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 24 hours Maximum # applications/year: 3
	Oriental fruit moth	2nd generation oriental fruit moth (pg. 163)	104 mL/ha		
Up-Cyde 2.5 EC	Tarnished plant bug	Special sprays (when monitoring indicates the need during early green fruit stage to pit hardening) (pg. 163)	280 mL/ha	Use in 550 L water/ha	Common name: cypermethrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 2
	Oriental fruit moth	2nd generation oriental fruit moth (pg. 163) 3rd generation oriental fruit moth (pg. 164) Prepick spray (pg. 164)	280 mL/ha	Use in 550 L water/ha	

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 7: Pear Calendar					
Altacor	Obliquebanded leafroller	Petal fall (pg. 170) Summer spray (pg. 171)	285 g/ha	For overwintering obliquebanded leafroller apply at petal fall in orchards with historical pest problems or high pest pressure. For obliquebanded leafroller summer generation, apply at 240–280 degree days C (base 6.1 C°) after biofix (first sustained moth catch) For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required. For codling moth, apply before 1st egg hatch, 80 degree days C (base 11 C°) after biofix of first sustained moth catch in traps. Monitor populations and reapply 10–14 days later if required. Be aware of the 14 days to harvest interval.	Common name: chlorantraniliprole Group 28 insecticide Preharvest interval: 14 days Re-entry period: 12 hours Maximum # applications/year: 3 Do not exceed 645 g/ha per year
	Oriental fruit moth	Second cover (pg. 172) Special sprays (about mid-Aug and early Sept) (pg. 172)	215 g/ha		
	Codling moth	Special spray (pg. 170) Summer sprays (pg. 171) Special sprays (about mid-Aug and early Sept) (pg. 172)	215 g/ha		
Delegate WG	Obliquebanded leafroller Green fruitworm	Petal fall (pg. 170) Summer spray (pg. 171)	420 g/ha	When used at petal fall, Delegate will also suppress plum curculio. For overwintering obliquebanded leafroller apply at petal fall in orchards with historical pest problems or high pest pressure. For summer generation OBLR, apply at 240–280 degree days C (base 6.1 C°) after biofix of first sustained moth catch. For oriental fruit moth, apply at 1st egg hatch, 50–100 degree days C (base 7.2 C°) after biofix (first sustained moth catch). Monitor populations and reapply 10–14 days later if required.	Common name: spinetoram Group 5 insecticide (naturalyte) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3 Spray tank solution should be between pH 6 and 8 for optimum control.

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 7: Pear Calendar (continued)					
Delegate WG (cont'd)	Oriental fruit moth	Second cover (pg. 172) Special sprays (about mid-Aug and early Sept) (pg. 172)	420 g/ha	For codling moth apply at 2–3 days earlier (~80 degree days C, base 11 C°) than conventional insecticides in orchards with high pest pressure. Repeat at 14 day intervals to maintain control, if required.	
	Codling moth	Special spray (pg. 170) Summer sprays (pg. 171) Special sprays (about mid-Aug and early Sept) (pg. 172)	420 g/ha		
Movento 240 SC	Pear psylla	Green tip (pg. 168) Prebloom (pg. 169) Petal fall (pg. 170) First cover (pg. 171) Summer sprays (pg. 171)	365 mL/ha	Most effective on young stages. Control may not be apparent for up to one week. Allow at least 14 days between applications. If psylla pressure is high, use the higher labelled rate of 435 mL/ha.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.83 L/ha
	San Jose scale	Special sprays (when monitoring indicates the need at Petal fall) (pg. 170) Special sprays (when monitoring indicates the need at First Cover) (pg. 171)	585 mL/ha		
Perm-UP	Pear psylla	First cover (pg. 171) Summer sprays (pg. 171)	520 mL/ha	Apply when most of the population is in early instar stages. Psylla resistance to pyrethroid insecticides may be present.	Common name: permethrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours
Silencer 120 EC	Pear psylla	First cover (pg. 171) Summer sprays (pg. 171)	83 mL/ha	Apply when most of the population is in early instar stages. Psylla resistance to pyrethroid insecticides may be present.	Common name: lambda-cyhalothrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 24 hours Maximum # applications/year: 3
Up-Cyde 2.5 EC	Pear psylla	First cover (pg. 171) Summer sprays (pg. 171)	280 mL/ha	Apply when most of the population is in early instar stages. Psylla resistance to pyrethroid insecticides may be present.	Common name: cypermethrin Group 3 insecticide (pyrethroid) Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: 3
Chapter 7: Plum Calendar					
Movento 240 SC	Aphids	Special sprays (pg. 176)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to one week. Allow at least 14 days between applications.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.12 L/ha

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 8: Walnut Calendar					
Movento 240 SC	Aphids	Early growth (pg. 181)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to 1 week. Allow at least 14 days between applications. Thorough coverage is necessary for good control of scale and aphid pests. Toxic to bees, aquatic organisms and some beneficial insects. Do not apply Movento 240 SC when neighbouring flowering crops are in bloom. See product label for recommendations to prevent spray drift.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.58 L/ha
	San Jose scale	May–June (pg. 181)	585 mL/ha		
Chapter 8: Pecan and Sweet Chestnut Calendar					
Movento 240 SC	Aphids	Early growth (pg. 182)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to 1 week. Allow at least 14 days between applications. Thorough coverage is necessary for good control of scale and aphid pests. Toxic to bees, aquatic organisms and some beneficial insects. Do not apply Movento 240 SC when neighbouring flowering crops are in bloom. See product label for recommendations to prevent spray drift.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.58 L/ha
	San Jose scale	May–June (pg. 182)	585 mL/ha		
Chapter 8: Filbert/Hazelnut Calendar					
Flint 50 WG	Eastern filbert blight	Bud break (pg. 182)	140 g/ha	Use 140 g/ha on small trees, or up to 280 g/ha on larger trees. Begin applications at bud break and continue as needed on a 14 day interval. Make no more than 2 consecutive applications then choose fungicides from a different family for the next 2 applications. Avoid drift especially to Concord grapes.	Common name: trifloxystrobin Group 11 Fungicide Preharvest interval: 60 days Re-entry period: 12 hours Maximum # applications/year: 4

Product to Add	Diseases and Insects	Timing	Rate	Comments	Other information
Chapter 8: Filbert/Hazelnut Calendar (continued)					
Movento 240 SC	Aphids	Early growth (pg. 182)	365 mL/ha	Most effective on young stages of aphids. Control may not be apparent for up to 1 week. Allow at least 14 days between applications. Thorough coverage is necessary for good control of scale and aphid pests. Toxic to bees, aquatic organisms and some beneficial insects. Do not apply Movento 240 SC when neighbouring flowering crops are in bloom. See product label for recommendations to prevent spray drift.	Common name: spirotetramat Group 23 insecticide Preharvest interval: 7 days Re-entry period: 12 hours Maximum # applications/year: Do not exceed 1.58 L/ha
	San Jose scale	May–June (pg. 182)	585 mL/ha		

Buffer zones (Table 9-5, pg.194–195) (aquatic, or sensitive terrestrial habitat)			
Product	**Buffer zone distance between field and sensitive area**	**Product**	**Buffer zone distance between field and sensitive area**
Allegro 500F	**Field sprayers:** freshwater habitat – 40 m buffer terrestrial habitat – 1 m buffer	Movento 240 SC	**Airblast sprayer:** Early growth stage terrestrial habitat – 2 m buffer Late growth stage terrestrial habitat – 1 m buffer
Altacor	**Airblast sprayers:** Early growth stage freshwater habitat less than 1 m deep – 10 m buffer freshwater over 1 m deep — 4 m buffer Late growth stage freshwater habitat less than 1 m deep – 5 m buffer freshwater over 1 m deep – 2 m buffer	Perm-UP	**Airblast sprayer:** water bodies, fish or waterfowl habitat –15 m buffer **Field sprayer:** water bodies, fish or waterfowl habitat – 15 m buffer
		Revus	Specific buffer not specified on label
Delegate WG	**Field sprayers:** freshwater habitat less than 1m deep – 10 m buffer freshwater over 1 m deep – 5 m buffer terrestrial habitat – 1 m buffer **Airblast sprayers:** Early growth stage freshwater habitat less than 1 m deep – 40 m buffer freshwater over 1 m deep – 30 m buffer terrestrial habitat – 2 m buffer **Airblast sprayers:** Late growth stage freshwater habitat less than 1 m deep – 30 m buffer freshwater over 1 m deep – 25 m buffer terrestrial habitat – 1 m buffer	Silencer 120 EC	**Airblast sprayer:** fresh water and wetland areas – 80 m buffer **Field sprayer:** fish or waterfowl habitat – 15 m buffer
		Up-Cyde 2.5 EC	**Airblast Sprayer:** water bodies, fish or waterfowl habitat – 15 m buffer **Field sprayer:** water bodies, fish or waterfowl habitat – 15 m buffer **Aerial application:** freshwater, including ponds and wetlands – 100 m buffer
Maxcel	Specific buffer not specified on label		

Notes on the use of MaxCel on Apples

A new formulation of 6-BA for thinning apples — MaxCel® — has been approved by the Pest Management Regulator Authority (PMRA) as of December, 2007. Valent Biosciences reports that Accel®, first registered in Canada in the spring of 1996, will be eventually phased out to be replaced by the MaxCel® formulation.

The active ingredient in MaxCel® is 6-benzyladenine (6-BA). 6-BA is a cytokinin, a class of growth regulator that promotes cell division. MaxCel® contains 1.9% 6-BA, which is slightly more concentrated than Accel®, and unlike Accel®, it contains no gibberellic acid ($GA_{4,7}$). Prior research has demonstrated that the gibberellic acids contained in the Accel® formulation, can in some instance decrease the thinning efficacy of 6-BA when applied at higher concentrations (>150 ppm) and may also inhibit flowering the following season. One further advantage the manufacturer states is that the new MaxCel® formulation contains additives to enhance absorption and provide increased product stability and solubility of the active ingredient. Several comparisons of MaxCel® and Accel® are shown in Table 1.

Using MaxCel® to increase fruit size: The product label states that MaxCel® can be used to enhance fruit size with mild or no thinning. Two to four applications, beginning at petal fall and repeating every 3–10 days, are required for enhancing fruit size. Suggested rates are 10–50 mg/L 6-BA (ppm), but the label cautions that some easy to thin cultivars and/or environmental conditions may result in fruit thinning.

Using MaxCel® to Thin: The product label states that MaxCel® can be used at rates of 75 to 200 mg/L 6-BA. Research at Simcoe has shown that 6-BA at concentrations ranging from 50–75 mg/L 6-BA, is a mild thinner. However, if used alone at rates up to 200 mg/L or combined with Sevin (carbaryl) for harder to thin cultivars, the spray mixture becomes much more aggressive.

Suggested Use Pattern: While 6-BA is not an ideal thinning compound for all cultivars, it has exhibited effectiveness for Empire, McIntosh, Idared, and Gala and many other varieties. MaxCel® and Accel® currently have one advantage over other chemical thinners (NAA and carbaryl) by thinning as well as increasing fruit size. This is achieved by stimulating cell division in the early stages of fruit growth and development.

The thinning response to 6-BA is concentration dependant, meaning that increasing the concentration applied generally will result in increased thinning activity. MaxCel® at 100–150 ppm is likely to provide a slightly stronger thinning response than what might be expected from Accel because of absence of gibberellins in MaxCel®. While most growers considered Accel® to be a mild thinner, the MaxCel® label will permit a range of rate options from mild through aggressive thinning.

If mild thinning is desired, similar to the results obtained with Accel®, then 75 ppm MaxCel® is a good starting point. For moderate thinning with easy to moderately difficult cultivars, 75–100 ppm is acceptable, while 100–150 ppm might be used for more difficult to thin cultivars. MaxCel® can be used by itself or in combination with Sevin where more aggressive thinning is desired. Table 2 contains suggested rates of MaxCel® and Sevin® XLR Plus. It is important to review *Publication 360, Fruit Production Recommendations* for further information on cultivar sensitivity to fruit thinners and other information regarding the chemical thinning of apples.

Table1. Summary of Selected Differences between MaxCel® and Accel®		
	MaxCel®	**Accel®**
Percent active ingredient: 6-BA GA_{4+7}	6-BA: 1.9% (w/w) —	6-BA: 1.8% (w/w) GA_{4+7}: 0.18% (w/w)
Amount of 6-BA per L of product	19.9 g/L	19.0 g/L
Container size	5 L bottle	1 L bottle
Maximum number of sprays per season	2 for thinning, 4 for fruit size enhancement	2
Amount of product/hectare per season as stated on label	0.5–22.5 L (10–446 grams 6-BA)	1.5–4 L (28.5–76 g)
Range in application rates stated on product label	10–200 mg/L (ppm)	28–75 mg/L (ppm) (based on above at 1,000 L/ha)
Pre-harvest interval	86 days	28 days
Enhanced formulation to improve product absorption	Yes	No
Compatibility with Sevin and other pesticides	Labels states "compatibility with Sevin and other pesticides"	Label indicates "No information is available on spray tank-mix compatibility with other control products"

Table 2. Suggested rates of MaxCel® to use with or without Sevin®					
Desired Response[1]	**Concentration of 6-BA (ppm)**[2]	**Concentration rate of Carbaryl (ppm)**[2]	**Number of Applications**	**Amount of MaxCel® per 1,000 L water. Apply to 1 ha**	**Amount of Sevin ® XLR Plus per 1,000 L water. Apply to 1 ha**
Enhance size only[3] [4]	10–50	–	2 to 4	0.5–2.5 L	–
Mild thinning and sizing	50–75	–	1 to 2	2.5–3.75 L	–
Moderate thinning and sizing	75–100	–	1 to 2	3.75–5.0 L	–
	50–75	500	1 to 2	2.5-3.75 L	1 L
Aggressive thinning and sizing	100–150	–	1 to 2	5.0–7.5 L	–
	75–100	500–1,000	1 to 2	3.75–5.0 L	1–2 L
Very aggressive thinning and sizing	150–200	–	1 to 2	7.5–10 L	–
	100–125	1,000	1 to 2	3.75–5.0 L	2 L

[1] There are several factors that influence the chemical thinning outcome. Rates are generally chosen on the degree of cultivar sensitivity to chemical thinners. Consult Publication 360 for further information on cultivars sensitivity to chemical thinners.

[2] 1 ppm is equivalent to 1 mg/L.

[3] Mild thinning may occur under some conditions (weak trees, young trees, sensitive cultivars, and environmental conditions that favour the thinning response)

[4] While 6-BA has the potential to increase cell division and enhance fruit size beyond the thinning (crop load) effect alone, this is not observed in all years because the response can be affected by spray concentration, coverage, cultivar, tree health, time of application, tree stress, and environmental conditions during and following spray application.

Table 3. The relationship between spray water volumes, grams active ingredient (BA) per hectare, litres of product per hectare and final tank concentration of MaxCel® [1]

Spray volume required (litres/ha)	MaxCel Rate grams 6-BA/hectare						
	10	25	50	75	100	200	446
	litres of product per hectare						
	0.5	1.3	2.5	3.8	5.0	10.1	22.4
	concentration of 6-BA (mg/L or ppm)						
200	50	125	250	375	500	1000	2230
300	33	83	167	250	333	667	1487
400	25	63	125	188	250	500	1115
500	20	50	100	150	200	400	892
600	17	42	83	125	167	333	743
700	14	36	71	107	143	286	637
800	13	31	63	94	125	250	558
900	11	28	56	83	111	222	496
1000	10	25	50	75	100	200	446
1500	7	17	33	50	67	133	297
2000	5	13	25	38	50	100	223

[1] Concentrations of 6-BA in light grey shaded area are not recommended (for either sizing or thinning).

Since the label is based on a per hectare basis, the maximum concentration applied depends upon the size of the tree and volume of water used to obtain good coverage. Table 3 provides the relationship between water volumes, grams active ingredient (BA) per unit area, and concentration (ppm).

Pre-harvest Interval: Another change on the MaxCel® label is that the pre-harvest interval (PHI) has been increased from 28 to 86 days. This means that MaxCel® may not be a good choice for very early season varieties, but apart from that, this change is minor.

Timing: The window of best response for MaxCel® for thinning is between 5 and 15 mm fruit size. To determine the average fruit size, select five to 10 spurs and measure fruit size of all the fruit on the spurs and then calculate an average fruit size. The label states that for enhancing fruit size, applications spray should begin at petal fall and be repeated up to four times at 3–10 day intervals.

Apply MaxCel® dilute (do not concentrate more than 2X) in 500–2,000 L of spray solution per hectare. Uniform and thorough coverage is essential. Research at the Simcoe Horticultural Experiment Station indicates that concentrations below 50 ppm 6-BA are ineffective for thinning and single applications of at least 50 ppm are necessary for improving fruit size. Multiple applications at lower concentrations may be equally effective; however we are lacking any data from Simcoe to confirm this recommendation.

Do not apply MaxCel® in combination with NAA or NAD (either tank mix or separate sprays) during the same growing season to Delicious or to Fuji, as this combination may result in the formation of pygmy fruit.

Environmental Conditions: The effectiveness of chemical thinners is influenced by the weather in several ways. MaxCel® is no exception. To optimize plant uptake of the spray solution, apply MaxCel® during periods of slow drying (for example, early morning). Best results are obtained when warm temperatures (greater than 20°C) occur during and following application.

Conclusion: The registration of MaxCel® represents an improvement in 6-BA technology. Growers will be able to use highly effective concentrations, either as a stand-alone thinner or in combination with carbaryl.

FOR YOUR NOTES

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